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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/607,619	06/30/2000	Raja Banerjee	Banerjee 6-8-10-5	8527
22186	7590	06/02/2004	EXAMINER	
MENDELSON AND ASSOCIATES PC 1515 MARKET STREET SUITE 715 PHILADELPHIA, PA 19102			GHULAMALI, QUTBUDDIN	
			ART UNIT	PAPER NUMBER
			2631	8

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/607,619

Applicant(s)

BANERJEA ET AL.

Examiner

Qutub Ghulamali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-13 and 15-21 is/are rejected.
- 7) ☒ Claim(s) 4 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Acknowledgment***

1. This Office Action is responsive to the Amendment filed on 03/04/2004.

### ***Response to Arguments***

2. Applicant's arguments filed 03/04/2004 have been fully considered but they are moot in view of newly found art. Rejection based on the newly found art follows:

### ***Drawings***

3. This application, filed under former 37 CFR 1.60, lacks formal drawings. The informal drawings filed in this application are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings. In unusual circumstances, the formal drawings from the abandoned parent application may be transferred by the grant of a petition under 37 CFR 1.182.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1, 3, 5-7, 11, 13, 15-17, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, IV et al ("Jones") (US Patent No. 6,657,950) and in view of Johnson et al ("Johnson") (US Patent 5,909,463, newly cited art).

Consider claims 1, 11, 21, Jones teaches a digital communication system of translating data to be transmitted into a series of symbols, successive burst of frequency domain symbols are input to an IFFT processing block 302 to obtain successive burst of symbols in the time domain. Jones though teaches an upsampler 102 intersperse three zeros between each base band symbol to increase the sampling rate, Jones, however, does not disclose a transmit path configured to append one or more zeros to each set of received downstream coefficients and to convert each set of zero-padded downstream coefficients into a corresponding block of downstream digital samples at the second data rate (col. 1, lines 40-67; col. 2, lines 1-3, 55-63; col. 3, lines 55-64; col. 4, lines 40-60).

Johnson discloses a transceiver for an asymmetric communication system comprising a transmit port (path) said transmit path transmitting data at a first data rate, and a receive port (path) configured to receive data at a second data rate, a receive path 78 configured to receive downstream digital samples in a time domain TEQ 76 at the second data rate (fig. 2), a CES module 74 receives a digital representation of the transmit signal and decimates the said second cancellation signal as the cancellation signal, in the transmit path each transmit symbol contains a number of samples including a 4-sample cyclic prefix each transmit symbol is interpolated to a higher rate before the echo cancellation is performed by inserting seven zeros between each transmit data sample, an FFT 73 performs forward and inverse transformations between the time domain and frequency domain, the TEQ module includes a general finite

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impulse response (FIR) filter followed by a biquadratic infinite impulse response (IIR) filter stage each of these filters may be set to perform a desired filter operation depending on the use of the transceiver as either a central office or a remote terminal, the filter operation can be modified by changing the filter coefficients which are downloaded by the DSP processor core.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jones's communication system to allow zero-padding and rate compensation downstream as taught by Johnson (see abstract; col. 14, lines 20-34; col. 15, lines 34-50; col. 20, lines 15-65).

Regarding claims 3, 13, Jones teaches an interpolation filter selects the baseband component in the frequency domain, this component is shifted to an IF frequency, and in the time domain, the real part of the shifted signal is extracted, conversion of this real part to analog produces the analog IF signal (col. 1, lines 45-54).

Regarding claims 5, 6, 7, 15, 16, 17 Jones teaches frequency response of cyclic filter 406(fig. 5C), the functionality of upsampler 404 and cyclic filter 406 into IFFT processing block 402, the N-point frequency domain sequence input to IFFT processing block 402 is zero-padded to become a  $2N$  point frequency domain sequence with  $N/2$  zeroes being placed before and after the original N-point sequence, IFFT processing block 402 then performs a  $2N$  point IFFT rather than an N point IFFT, the patterns of zeroes in the frequency domain input to the  $2N$  point IFFT matches the desired areas of attenuation for cyclic filter 406, the IFFT processing thus incorporates production of images as would occur in interpolation combined with ideal low pass filter attenuation of alternating out of band images (col. 5, lines 15-65).

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6. Claims 2, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, IV et al ("Jones") (US Patent No. 6,657,950) in view of Johnson et al ("Johnson") (US Patent 5,909,463, newly cited art) as applied to claims 1, 11, 21 above, and further in view of Hsu et al ("Hsu") (US Patent 6,252,920).

As applied to claims 1, 11, 21 above, Jones and Johnson in combination teaches every aspect of the claimed invention, but does not explicitly teach a transmit and receive path connected to a codec.

In the same field of endeavor, *Hsu* discloses a communication system includes an analog-to-digital converter or a codec which converts an analog signal from an input line such as a telephone line to digital samples accessible to a host computer having native audio hardware, software executed by the host computer transfers the digital samples from the converter to the native audio hardware to provide audible sounds from the signal received on the input line, digital samples from the host computer (i.e. from a program executed by the host computer or from the audio hardware) are converted to an analog output signal transmitted on an output line. (col. 1, lines64-67; col. 2, lines1-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jones and Johnson communication system by employing the codec between the transmit and receive path to convert the upstream digital samples into analog modem signal for transmission in order to reduce distortion as taught by Hsu.

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7. Claims 2, 3, 8-10, 12, 13, 18, are further rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, IV et al ("Jones") (US Patent No. 6,657,950) in view of admitted prior art of instant application, hereinafter, referred to in fig. 1 as Prior Art.

Consider claims 2, 10, and 12, *Jones* teaches a modern digital communication system of translating data to be transmitted into a series of symbols, each symbol take on one of M possible complex values, a signal processing system that receives the downstream symbols (burst of symbols), an upsampler 102 (upstream) intersperses three zeroes (zero-padding) between each baseband symbol to increase the sampling rate by a factor of four to a new sampling frequency  $f_s$  (fig. 2B), with the effect of replicating the baseband symbol stream in the frequency domain, an interpolation filter selects the baseband component in the frequency domain, an successive burst of frequency domain symbols are input to an Inverse Fast Fourier transform (IFFT) processing block 302, IFFT processing block 302 applies the inverse Fast Fourier Transform to obtain successive burst of symbols in the time domain (col. 1, lines 40-67; col. 2, lines 1-3, 55-63; col. 3, lines 55-64; col. 4, lines 40-60). *Jones* does not disclose transmit and receive paths are coupled between DMT and a codec, and the blocks of upstream digital samples are generated for the codec and the blocks of downstream digital samples are generated by the codec. The admitted Prior Art (fig. 1), discloses a system 100 includes DMT transceiver 101 processing the modem signals in transmit (user to network) and receive (network to user) paths and codec 102 providing conversion between the bi-directional analog signals and the digital signals in the transmit and receive paths.

Consider claims 3 and 13, *Jones* teaches every aspect of the claimed invention as applied to claims 1, 11, 21 above, but fails to disclose the inverse transform module in the transmit path

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comprises an interpolator to generate the downstream digital samples at the second data rate.

The admitted Prior Art (fig. 1), discloses a system 100 includes difference in transmission rate of the digital samples between the transmit and receive paths is compensated for in the receive path by interpolation of the digital samples provided from the CP Add 104 typically performed by an interpolation filter or upsampler, such as upsampler 105.

Regarding claims 8 and 18, *Jones* teaches every aspect of the claimed invention as applied to claims 1, 11, 21 and above, but does not disclose the transmit path further includes a copy and add module that processes the downstream digital samples to provide a periodic signal. The admitted Prior Art (fig. 1), discloses a copy and add module (CP ADD) 104 in the transmit path of system 100.

Regarding claims 9, 19, and 20, *Jones* teaches every aspect of the claimed invention as applied to claims 1, 11, 21 and above, but does not disclose the circuit is embodied in an integrated circuit include at least one processor. The admitted Prior Art, disclosed in the background of the invention does reveal that it is possible that such a circuit could be implemented in an integrated form, page 2, lines 31-32.

#### ***Allowable Subject Matter***

8. Claims 4 and 14 are objected to as being dependent upon a rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.



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***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Martone (US Patent 6,285,720), Amrany et al (US Patent 6,584,160), Riazi et al (US Patent 6,618,367) are cited as arts of interest.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (703) 305-7868. The examiner can normally be reached on Monday-Friday from 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 703 306-3034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QG.  
May 19, 2004.

  
**KHAI TRAN**  
**PRIMARY EXAMINER** 5/24/04